

Claims

1. A needle guiding apparatus comprising:
a base defining an opening extending therethrough;
a guide assembly including at least one passage and being disposed within the opening,
the guide assembly being rotatable about at least one axis; and
an imaging sight disposed adjacent the at least one passage.
2. The apparatus of claim 1 wherein the guide assembly comprises a first transmission element between a first location within the opening and a second location remote therefrom, the first transmission element for transferring angular movement between the second location and the first location, the movement at the first location occurring about a first one of the at least one axis.
3. The apparatus of claim 2 wherein the first transmission element comprises a first pulley proximate the first location and disposed coaxially with the first axis of rotation.
4. The apparatus of claim 3 wherein the first transmission element further comprises a guide shaft defining at least a portion of the at least one passage.
5. The apparatus of claim 2 wherein the first transmission element comprises a belt for transferring angular movement between the first location and the second location.
6. The apparatus of claim 2 wherein the first transmission element comprises a control shaft connected to a second pulley proximate the second location.
7. The apparatus of claim 6 further comprising a lock for preventing movement of the first transmission element.

8. The apparatus of claim 2 wherein the guide assembly further comprises a second transmission element for transferring angular movement about a second one of the at least one axis.
9. The apparatus of claim 8 wherein the second transmission element comprises an adjustment rod rotatable about the second axis extending through the adjustment rod.
10. The apparatus of claim 9 wherein the imaging sight comprises a radiopaque core of the adjustment rod.
11. The apparatus of claim 9 further comprising a lock for preventing movement of the adjustment rod.
12. The apparatus of claim 9 wherein the imaging sight comprises at least two parallel bands disposed within the adjustment rod.
13. The apparatus of claim 8 wherein the first axis and the second axis are substantially perpendicular.
14. The apparatus of claim 1 wherein the imaging sight comprises a radiopaque band disposed within the base.
15. The apparatus of claim 1 wherein the guide assembly comprises an adjustment rod.
16. The apparatus of claim 15 wherein the adjustment rod is rotatable about an axis extending through the adjustment rod.
17. The apparatus of claim 15 wherein the adjustment rod is rotatable about an axis extending through the at least one passage.
18. The apparatus of claim 1 wherein the guide assembly comprises a turret disposed within the opening.
19. The apparatus of claim 18 wherein the turret includes an adjustment rod.

20. The apparatus of claim 19 wherein the turret is rotatable about an axis extending through the opening.
21. The apparatus of claim 19 wherein the adjustment rod is rotatable about an axis extending through the adjustment rod.
22. The apparatus of claim 1 wherein the guide assembly comprises a guide needle.
23. The apparatus of claim 1 wherein the guide assembly comprises a ball and socket joint disposed within the base.
24. The apparatus of claim 23 wherein the guide assembly further comprises a guide shaft defining a portion of the at least one passage.
25. The apparatus of claim 23 further comprising a control arm connected to the guide assembly.
26. The apparatus of claim 25 further comprising a second ball and socket joint connected to the control arm, thereby to replicate the movement of the second ball and socket joint at the guide assembly.
27. The apparatus of claim 26 wherein the second joint is capable of locking into a position.
28. The apparatus of claim 1 wherein the imaging sight is disposed coaxially about the at least one passage.
29. The apparatus of claim 1 wherein the imaging sight comprises a ring.
30. The apparatus of claim 1 wherein the imaging sight comprises at least one cross-hair.
31. The apparatus of claim 1 wherein the imaging sight includes a material that is detectable with a fluoroscope.
32. The apparatus of claim 31 wherein the material that is detectable with a fluoroscope comprises a radiopaque material.

33. The apparatus of claim 1 wherein the guide assembly includes at least two of the passages disposed at known angles relative to the base.
34. The apparatus of claim 1 further comprising at least one clamp for attaching the apparatus to a fixed surface.
35. The apparatus of claim 1 wherein the guide assembly is capable of locking into a position.
36. The apparatus of claim 1 wherein the guide assembly is rotatable about at least two axes and wherein at least two of the axes are substantially perpendicular.
37. The apparatus of claim 1 further comprising an entry needle, the needle capable of inserting through the at least one passage.
38. The apparatus of claim 37 wherein the entry needle comprises:
- a first assembly comprising,
 - a housing;
 - a stylet extending into the housing and biased towards a distal end of the entry needle; and
 - a hub adjacent the housing at a proximal end of the entry needle, the hub in connection with the stylet; and
 - a second assembly comprising a cannula surrounding the stylet, wherein the first assembly and the second assembly seal together and are separable.
39. The apparatus of claim 38 wherein the hub is movable from a first position to a second position, the hub in the first position indicating that the entry needle is impeded by a tissue and the hub in the second position indicating that the entry needle is substantially unimpeded by the tissue.

40. The apparatus of claim 38 wherein the stylet includes a blunt edge at a distal end of the stylet.
41. The apparatus of claim 38 wherein the cannula includes an angled edge at a distal end of the cannula.
42. The apparatus of claim 38 wherein the stylet includes an angled edge at a distal end of the stylet.
43. The apparatus of claim 38 wherein the cannula includes a blunt edge at a distal end of the cannula.
44. The apparatus of claim 38 further comprising a connector connected with the cannula for attaching a medical device to the entry needle.
45. The apparatus of claim 37 wherein the entry needle comprises an inner needle coaxially surrounded by a cannula having an outer wall defining a lumen.
46. The apparatus of claim 45 wherein the cannula has an opening in the outer wall proximate a distal end of the entry needle and a branch proximate a proximal end of the entry needle and wherein the inner needle includes a notch.
47. The apparatus of claim 46 wherein the inner needle is rotatable from a first position to a second position, the notched inner needle in the first position allowing communication between the opening and the branch and the notched inner needle in the second position preventing communication between the opening and the branch.
48. The apparatus of claim 46 wherein the branch is capable of attaching to a suction device.
49. The apparatus of claim 37 wherein the entry needle includes an electromagnetic energy sensor.
50. The apparatus of claim 37 wherein the entry needle includes a chemical sensor.

51. The apparatus of claim 1 wherein the guide assembly does not protrude past at least one side of the base.
52. A method for aiming a needle guiding apparatus comprising the steps of:
providing a needle guiding apparatus comprising a base having an opening, a guide assembly defining at least one passage and disposed within the opening, the guide being rotatable about at least one axis, and an imaging sight disposed adjacent the at least one passage;
aligning the imaging sight with at least a portion of a target and with an energy source;
and
viewing the sight on a display.
53. The method of claim 52 wherein the imaging sight is selected from the group consisting of a ring of radiopaque material, a bar of radiopaque material, a cross-hair of radiopaque material, a diamond shape of radiopaque material, cross-hairs of radiopaque material, perpendicular bars of radiopaque material, and combinations thereof.
54. The method of claim 53 wherein the viewing step comprises viewing the imaging sight on the display, the imaging sight appearing to surround the at least a portion of a target and at least a portion of the guide assembly, thereby indicating proper alignment.
55. The method of claim 54 wherein the guide assembly comprises a guide shaft.
56. The method of claim 55 wherein the viewing step comprises viewing the imaging sight on the display, the imaging sight appearing to surround the guide shaft and the at least a portion of a target, thereby indicating proper alignment.
57. A needle guiding apparatus comprising:
a base defining an opening extending therethrough;

a guide assembly comprising a turret rotatably mounted in the opening and an adjustment rod rotatably mounted in the turret, the guide assembly including at least one passage therethrough; and

an imaging sight disposed adjacent at least one passage.

58. The apparatus of claim 57 wherein the turret includes a groove for interlocking with pins from the base, thereby to allow rotation of the turret within the base.

59. The apparatus of claim 57 wherein the turret is associated with the base using a friction fit, thereby to allow rotation of the turret within the base.

60. The apparatus of claim 57 wherein the guide assembly does not protrude beyond at least one side of the base.

61. A needle guiding apparatus comprising:

a base including a socket;

a guide assembly including at least one passage therethrough and including a ball articulable within the socket and a guide shaft proximate the ball; and

an imaging sight disposed adjacent at least one passage.

62. The apparatus of claim 61 further comprising a connecting rod in operable connection with the guide assembly and with a mechanism, the mechanism being remote from the guide assembly, thereby to replicate movements of the mechanism at the guide assembly.

63. The apparatus of claim 62 wherein the mechanism comprises a base assembly including a socket, a ball being articulable in the socket, and a shaft proximate the ball.

64. The apparatus of claim 62 further comprising a lock, thereby to prevent movement of the guide assembly.

65. The apparatus of claim 61 wherein the base includes an opening extending therethrough and the guide assembly is disposed within the opening.
66. A needle guiding apparatus comprising a base, a dome, and a guide assembly including a stop and defining a passage, such that the guide assembly is positionable at various locations through the dome and the guide assembly does not protrude beyond at least one surface of the base.
67. The apparatus of claim 66 wherein the dome includes an imaging sight.
68. A needle guiding apparatus comprising:
a base defining an opening extending therethrough;
a guide assembly comprising a turret rotatable within the opening, the turret defining at least two passages therethrough, the passages being at known angles of entry relative to the base;
and
an imaging sight adjacent at least one passage.
69. A needle guiding apparatus comprising:
a base defining an opening extending therethrough;
a guide assembly comprising a guide needle including a passage therethrough, the guide needle being rotatable about an axis that extends through the base and is substantially perpendicular to the guide needle; and
an imaging sight adjacent the passage.
70. The apparatus of claim 69 further comprising at least one driving bar for inserting an entry needle through the passage.
71. The apparatus of claim 70 further comprising at least one bar guide for sliding at least one driving bar along a predetermined range of motion.

72. The apparatus of claim 69 further comprising at least one driving bar for applying force to the guide assembly.

73. The apparatus of claim 72 further comprising at least one bar guide, wherein at least one driving bar is affixed to the at least one bar guide such that applied force is conveyed from the at least one driving bar to the guide assembly.

74. A needle guiding apparatus comprising:

a base defining an opening extending therethrough;

a guide assembly comprising an adjustment rod rotatable about an axis extending through the adjustment rod and a guide needle extending through the adjustment rod and defining a passage extending therethrough; and

an imaging sight adjacent the passage.

75. The apparatus of claim 74 further comprising a lock for preventing movement of the alignment rod.

76. The apparatus of claim 74 further comprising at least one driving bar associated with an entry needle for applying force to the entry needle, the entry needle passing through the passage.

77. The apparatus of claim 76 further comprising at least one bar guide for sliding at least one driving bar along a predetermined range of motion.

78. The apparatus of claim 74 comprising at least one driving bar for applying force to the guide assembly.

79. The apparatus of claim 78 further comprising at least one bar guide, wherein at least one driving bar is affixed to the at least one bar guide such that applied force is conveyed from the at least one driving bar to the guide assembly.

80. An entry needle comprising:

a first assembly comprising,

a housing;

a stylet extending into the housing and biased towards a distal end of the entry needle; and

a hub adjacent the housing at a proximal end of the entry needle, the hub in connection with the stylet; and

a second assembly comprising a cannula surrounding the stylet, wherein the first assembly and the second assembly seal together and are separable.

81. The apparatus of claim 80 wherein the hub is movable from a first position to a second position, the hub in the first position indicating that the entry needle is impeded by a tissue and the hub in the second position indicating that the entry needle is substantially unimpeded by the tissue.

82. The apparatus of claim 80 wherein the stylet includes a blunt edge at a distal end of the stylet.

83. The apparatus of claim 80 wherein the cannula includes an angled edge at a distal end of the cannula.

84. The apparatus of claim 80 wherein the stylet includes an angled edge at a distal end of the stylet.

85. The apparatus of claim 80 wherein the cannula includes a blunt edge at a distal end of the cannula.

86. The apparatus of claim 80 further comprising a connector connected with the cannula for attaching a medical device to the entry needle.